THE ATOM

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COVER:

Soon after the Pommard shot at the Nevada Test Site, members of a recovery team checked a target sled, while an air sampler aircraft flew over ground zero. Pommard was the latest in a series of underground neutron physics experiments using a low-yield nuclear device. It was conducted by the Los Alamos Scientific Laboratory. Story begins on the next page.

POMMARD

By
Bill Richmond

An explosion can be destructive or constructive—it can blow up a building or dig the foundation for a new one.

In the same manner, a nuclear explosion can destroy a city . . . or it can furnish scientists with data unobtainable in any other way.

In mid-March, at the Nevada Test Site, the Los Alamos Scientific Laboratory conducted the latest in a series of underground neutron physics experiments using a low-yield nuclear device. The Pommard event produced additional data which will enable scientists to learn more about nuclear interactions, including fission cross sections.

The purpose of experiments such as Pommard is to utilize the high intensity short duration burst of neu-

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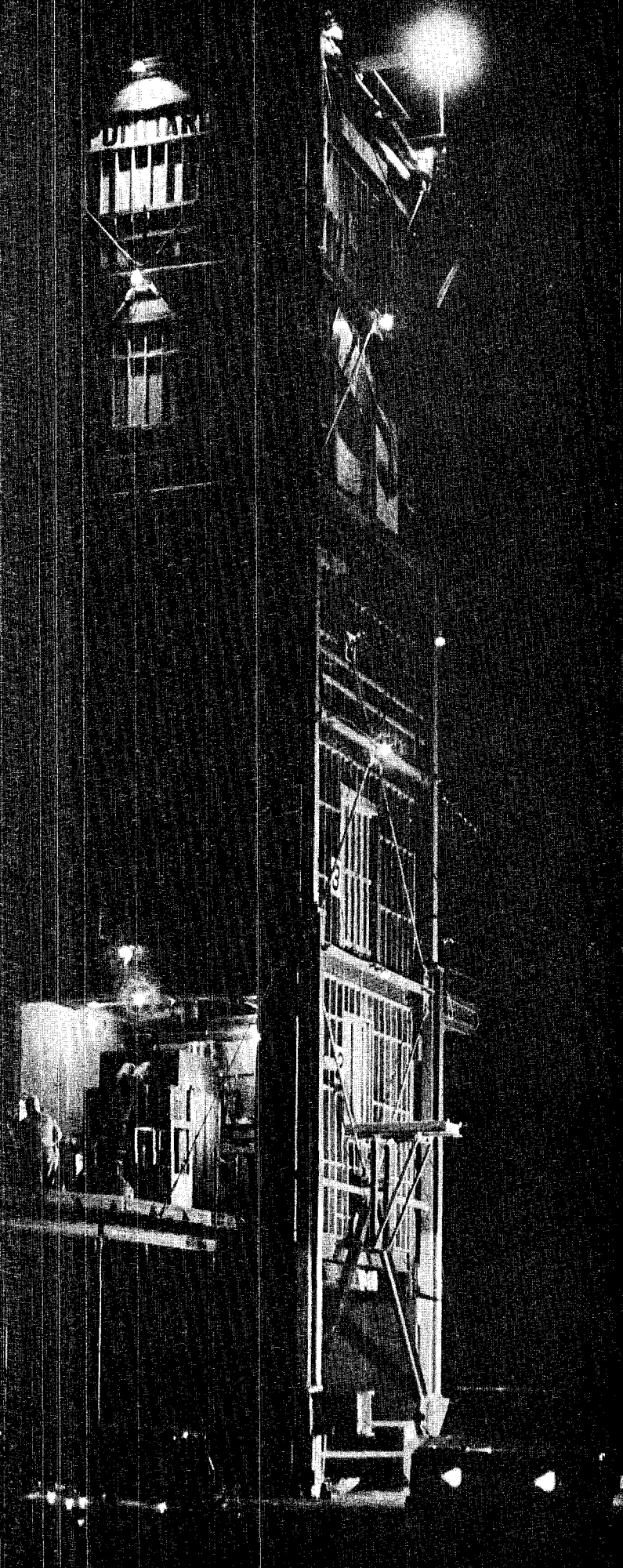

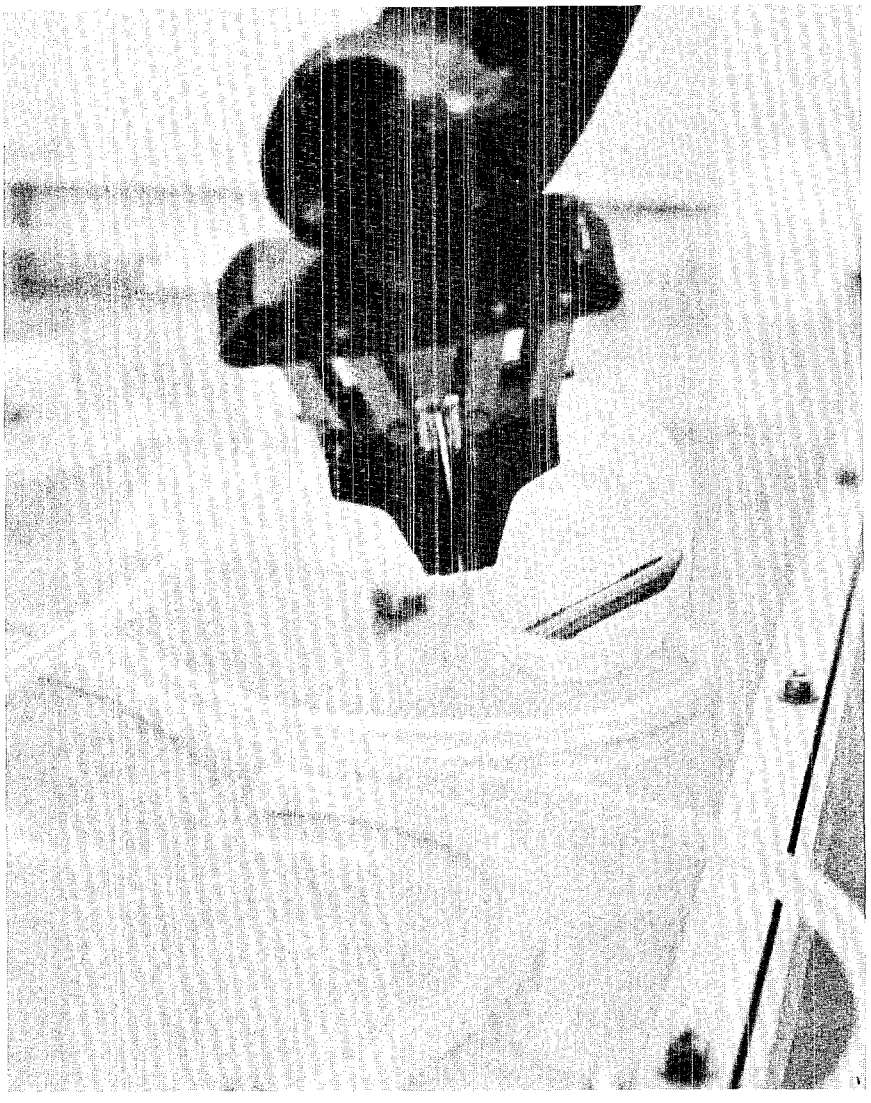

The rabbit, cylinder at right, containing the irradiated sample was sawed into thirds. The center third was recovered and dissolved to permit chemical purification. The rabbit registered 500 roentgens per hour at a distance of four inches when LASL radiochemists removed it from the shipping pig.

Pommard

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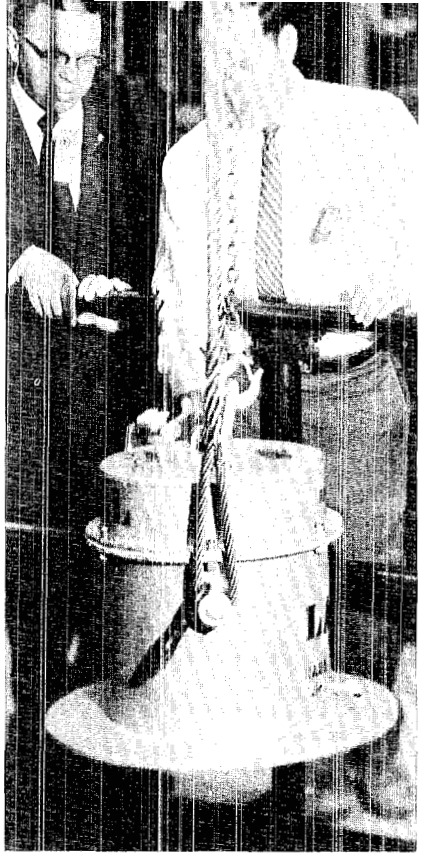
trons with various energies from an underground nuclear explosion. With such an intense source of neutrons, measurements can be made which would not be possible or would require about 100 years to make, using conventional neutron sources such as an accelerator. The results of these nuclear cross section measurements, most of which have been published and are not classified, have very important applications not only to weapon design but also to reactor design and other fields of applied and theoretical nuclear physics.

More than 50 experiments were tied onto the Pommard event. A six-floor tower was positioned directly over an evacuated pipe from the device to the surface. The neutrons travelled up this pipe, were split into separate beams at the surface, and then channeled to the various floors containing the numerous experiments. (The techniques for bringing neutrons up a pipe without, at the same time, venting radioactive debris to the atmosphere have been developed over the past few years by J-7 engineers.)

Among the special samples placed in the tower as a target for the neutron beam was an 18-microgram deposit of U^{237}, which has a half-life of only 6.75 days. This was unique in that it was the largest amount of this uranium isotope ever made available for scientific measurements. Because of its short half-life, a smooth sequence of events had to occur in order to provide an adequate amount of U^{237} in the neutron beam at shot time.

Forty-two milligrams of highly enriched uranium 236 encapsulated in a "rabbit"—constructed of aluminum for cooling purposes—were irradiated in the High Flux Isotope Reactor (HFIR) at Oak Ridge from February 16 through March 9. (A "rabbit" is a device to move a sample rapidly from one place, such as inside a research reactor, to another place, such as a radiochemistry laboratory. Rabbits often consist of small cylinders of aluminum or



LASL's Cal Longmire, J-11, left, watched the removal of a 1,050-pound lead pig containing the irradiated U^{236} sample from the Oak Ridge HFIR facility. The sample was rushed to Los Alamos for radiochemical purification and separation to obtain 18 micrograms of U^{237}. Randy Hobbs, HFIR shift engineer, is at right.

plastic, moved by air or water pressure through a long pipe.)

Under this intense neutron irradiation, a few per cent of the U^{236} was converted to about 900 micrograms of U^{237} by the neutron capture reaction. This highly radioactive sample was transferred to a 1050 pound lead "pig" and flown directly to Los Alamos on March 10, accompanied by Calvin Longmire, J-11. (A "pig" is a heavily shielded container, usually lead, which is used to ship or store radioactive materials.)

At J-11, radiochemical purification of the irradiated uranium was promptly begun, followed by the slow, but essential, electromagnetic isotope separation of the U^{237} from

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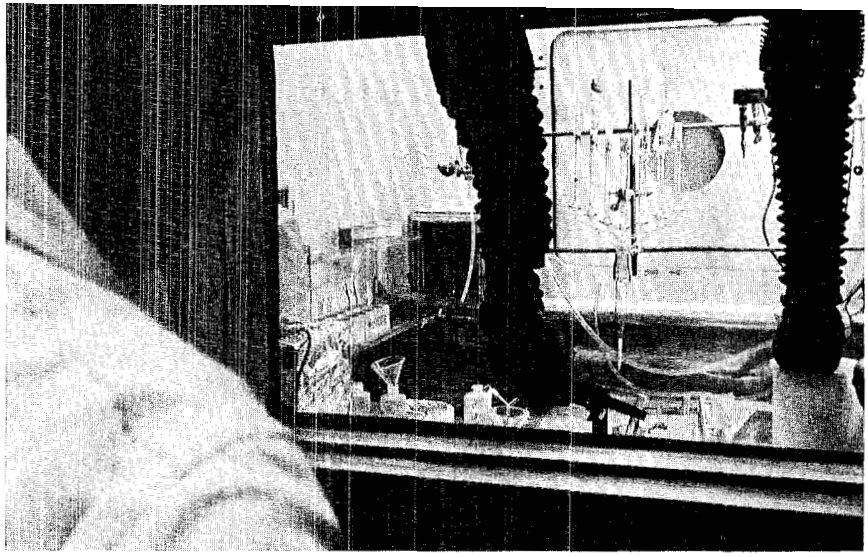
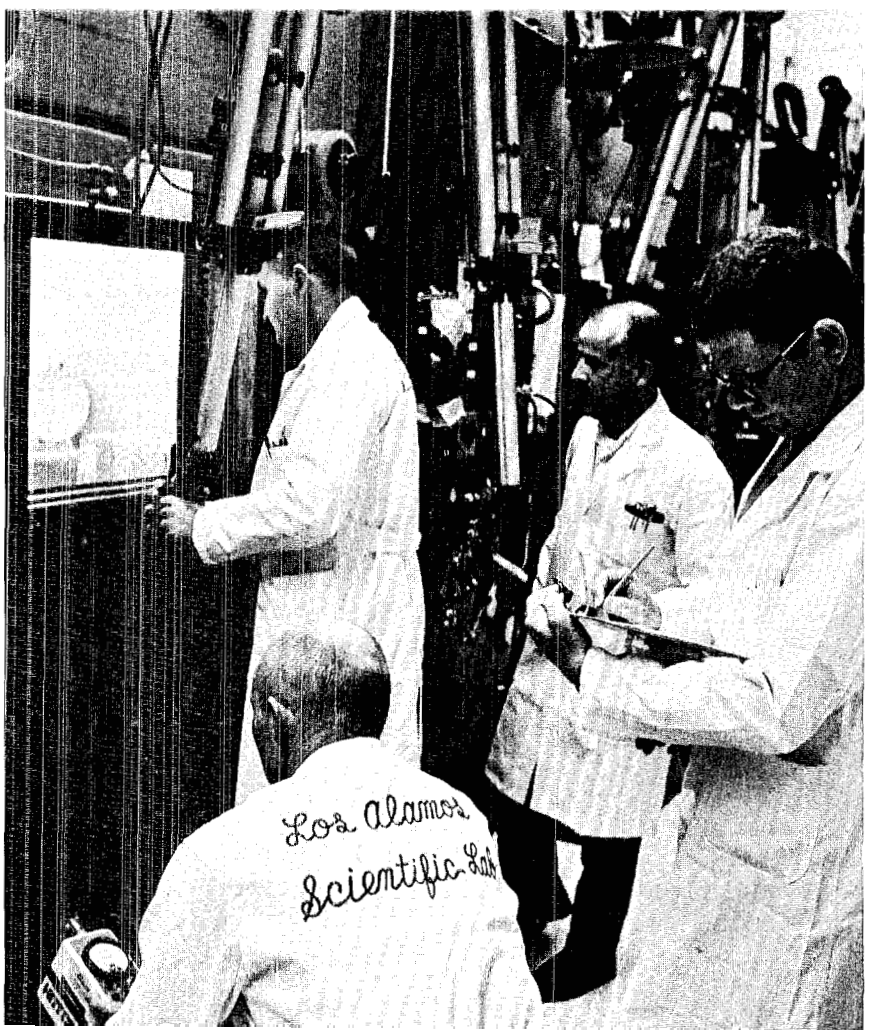


Bob Dye, J-11 technician, used his remote hands to hold a centrifuge tube containing the purified uranium. In center background is the ion exchange column where the uranium was sorbed on the resin bed at bottom. Reagents were added from the reservoir tubes to remove contaminants and finally to strip the uranium.

Progress of the purification was continuously checked by radiation measurements with a probe inside the hot cell. Jack Barnes, left foreground, watches meter while Bob Dye, at manipulator, brings sample near probe. Radiochemist Kurt Wolfsberg, right, who devised the purification procedure records data. Jim Villareal, background, performed a critical step of applying the sample on quartz wool.



Pommard

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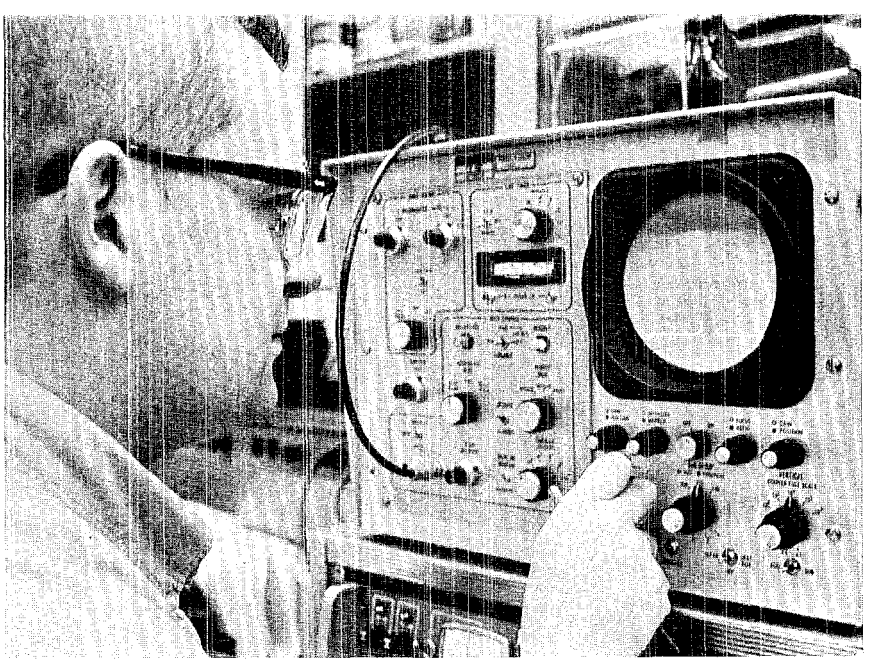
the remaining U^{236}. (About 90 per cent of the U^{236} was not changed by the irradiation.)

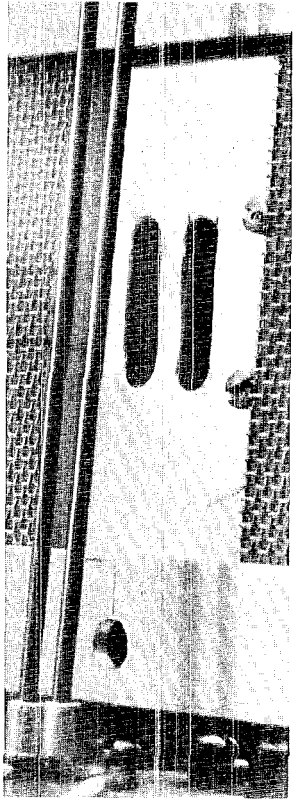
The radiochemical purification involved separation of the uranium from aluminum (the "rabbit" material) fission products, neptunium isotopes, and other unwanted isotopes produced in the irradiation. The high radiation level required that most operations be done in a hot cell. Several man months of time were needed to develop the remote processing equipment to carry out the purification scheme devised by Kurt Wolfsberg. A specially built air-operated vise held the rabbit while a two-bladed saw cut out the section containing the uranium. The operations of dissolving, filtration, ion exchange, liquid extraction, and precipitation resembled a miniature chemical plant in their hot cell configuration. Climax of the hot cell operation was the transfer of the chemically purified sample to a small quartz wool wad for its introduction to the ion source of the isotope separator.

Separation of the wanted (1.5 to 2 per cent) U^{237} from the bulk U^{236} sample was performed in J-11's elec-

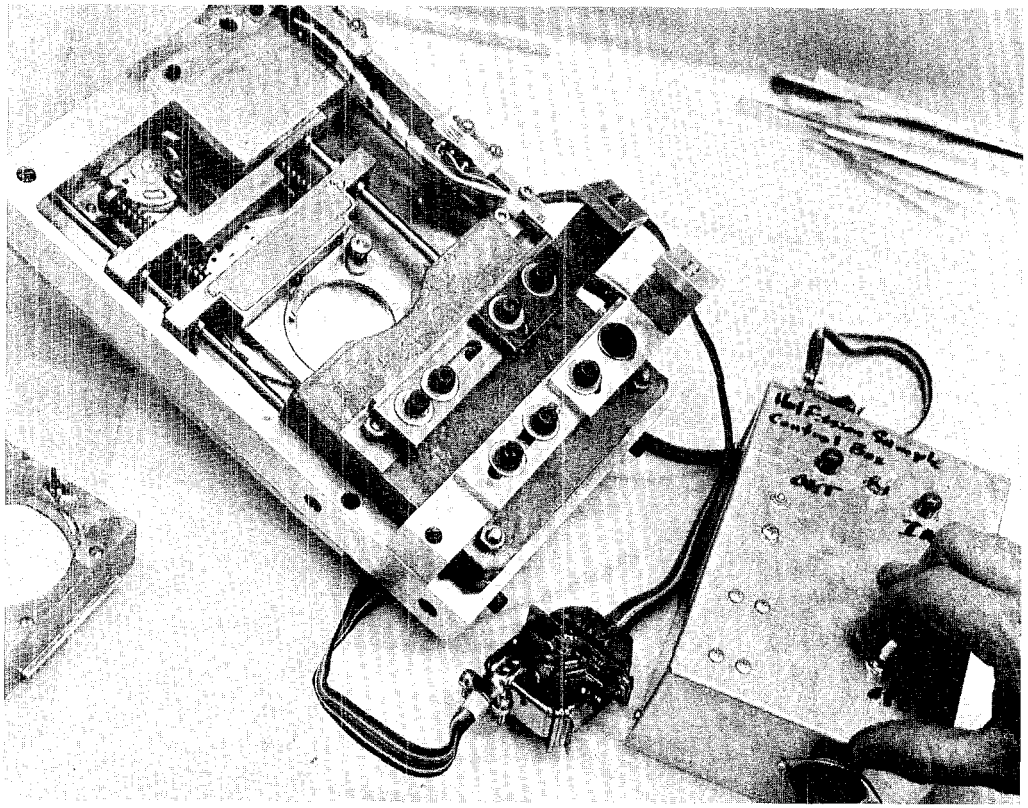
Bruce Dropesky, electromagnetic isotope separator operator, checked alignment of the retardation lens into which the beams of uranium ions went during the run.



Greg Kelley, J-11, who assisted during the isotope separator run, checks the amount of U^{237} collected, as measured by the height of a gamma ray peak displayed on pulse height analyzer.



This double slit plate was used in front of the retardation lens on the J-11 electromagnetic isotope separator. Two rods at left served to laterally stabilize the two ion beams.



The precious U^{237} was placed on a foil mounted in this specal P-3/W-8 shielded sample holder. Slide holding the sample foil is shown in the outward position as it was at shot time. U^{237} is on bottom side of foil and was protected before exposure to neutron beam by a shutter which opened at proper time. Sample then was retracted into lead shield at right. When in position at NTS shot tower, fission fragment detectors outside the neutron beam faced the sample and measured rate of fissioning of the uranium.

tromagnetic isotope separator, operated by Bruce Dropesky, with the assistance of Greg Kelley, both of J-11. The uranium was introduced into the separator ion source as U_3O_8. By heating this oxide and passing carbon tetrachloride vapor over it a volatile uranium chloride was formed which entered the arc discharge region of the ion source. Under electron bombardment the uranium compound was decomposed and uranium ions were formed. These ions were extracted from the ion source by a strong electric field and accelerated through a potential of 50,000 volts.

The beam of fast uranium ions passed through the powerful magnetic field of a 7-ton, 90° sector electromagnet. Under the influence of this magnetic field the slightly heavier U^{237} ions travelled along a slightly larger radius curved path than the U^{236} ions. At the collector, the separated uranium beams—about 12 millimeters high by 2-3 mm wide and 7 mm apart—were focused onto the entrance slit of the retardation lens.

In order to build up a deposit of many micrograms of an element over a small area, it is essential to slow the ions down so they stick to the collector foil rather than sputter off. Therefore the U^{237} ions were led into the retardation lens where they were decelerated from 50,000 volts to 300 volts and focused onto a thin stainless steel foil. At the entrance to the lens, the U^{236} ion beam landed in a small aluminum cup connected to a current integrator, for monitoring purposes. A highly directional gamma ray detector aimed at the location of the U^{237} deposit served to monitor the build-up of the U^{237} activity. Three separate uranium charges, totaling

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Richard Taschek, P division leader, inspected the tower before shot day.

Neel Glass, J-16 group leader.

Tense eyes focused on the TV monitor screens as the count-down proceeded toward zero.

Marvin Hoffman, J-12.

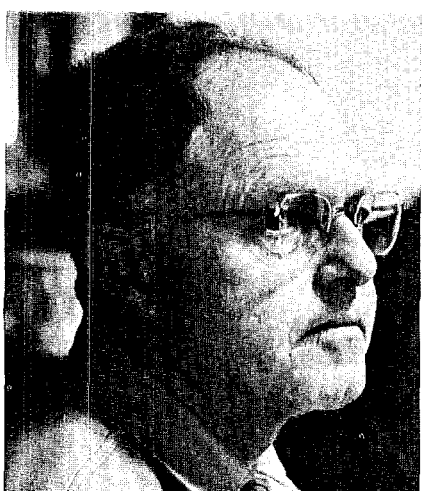
Richard Taschek, P division leader.

Robert Newman, J-DO, test group director.

Marvin Harlow, J-16 and Carlton Young, J-14.

Les Hackenberry, J-8.

Art Hemmendinger, W-8 group leader.



Pommard

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about 34 milligrams of U^{236} and about 50 curies of U^{237} were run through the separator ion source over a period of 40 hours in order to build up the required U^{237} deposit.

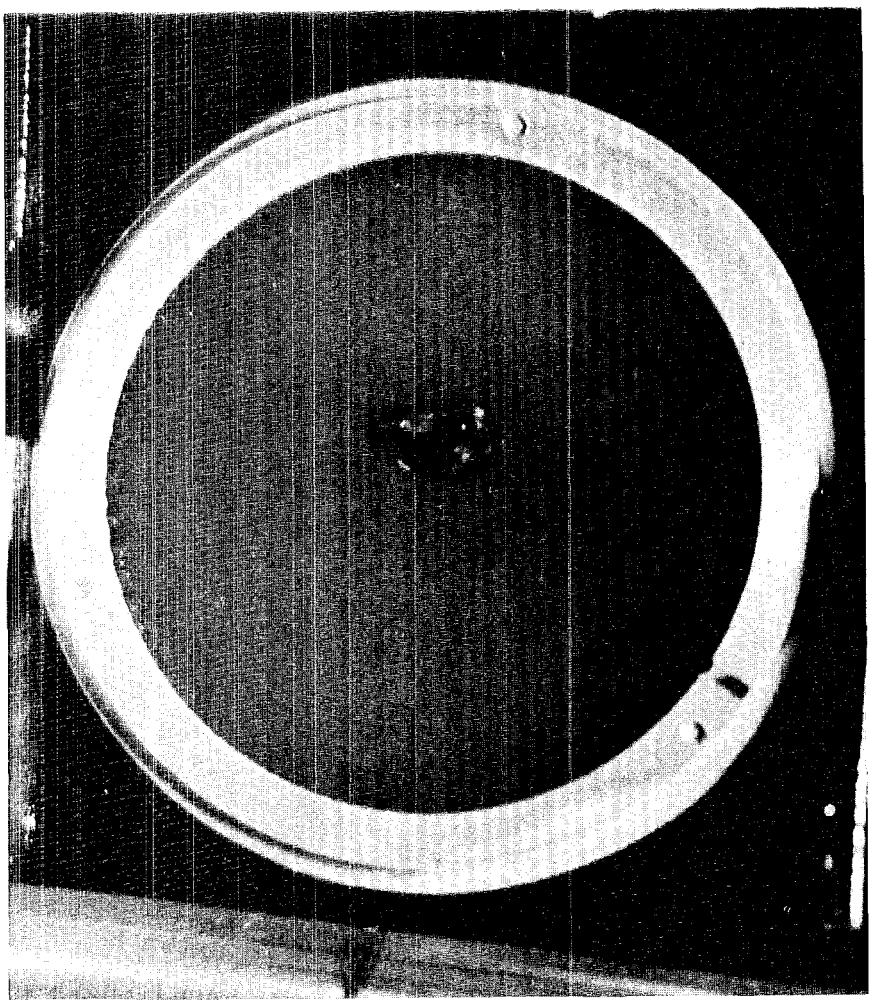
On the day before the Pommard event was scheduled, the collected U^{237} deposit was placed in a special shield, flown directly to the Nevada Test Site, and inserted in an experimental sled on the second floor of the shot tower.

The radioactive samples in an experiment such as Pommard remain in the pig until shortly before shot time. Then, at about minus 30 seconds, the samples automatically move out of the pig into the neutron beam area. Approximately one second after the shot the samples move back into the pig and the target sleds are pulled away from the tower. (This is to prevent damage and allow quick recovery of the samples, if and when the tower collapses into the subsidence crater which usually is caused by the underground explosion.)

The U^{237} sample—as well as a number of other targets—was recovered as soon as possible after the shot and flown back to "The Hill" for analysis.

As soon as the U^{237} arrived at J-11 in Los Alamos, additional measurements were made to determine the exact amount of U^{237} remaining, and size and shape of the deposit on the foil. The uranium was then dissolved from the foil. A small part of the solution was used to determine the exact composition (the ratio of U^{237} to Np^{237} daughter) of the sample at shot time. The rest of the sample, after chemical separation of the grown-in neptunium, represented a valuable amount of extremely pure U^{237}. Portions of this sample have been used for measurements of fission cross sections and other nuclear properties at LASL and at several other laboratories.

There were, of course, a number of other experiments—including several using other radioactive samples—tied onto Pommard in addition to the U^{237}.



Heaviest deposit of pure U^{237} ever prepared for nuclear physics measurement is shown, after exposure, at center of metal foil. It was returned to the J-11 radiochemistry facility for analysis.

On the ground floor of the tower the "neutron wheel" belonging to J-11 was installed under the direction of George Cowan, J-11 group leader. U^{233} was the target material for the wheel, which is two feet in diameter and spins at about 5,000 rpm. The neutrons from the nuclear explosion travelled up the evacuated pipe and were registered on the moving target of U^{233} at different times. The faster neutrons arrived first followed by the slower neutrons. The U^{233} was later cut into about 100 samples at LASL by members of CMB-11 at DP Site and radiochemical analysis was performed on these samples by J-11.

There were more than 20 samples

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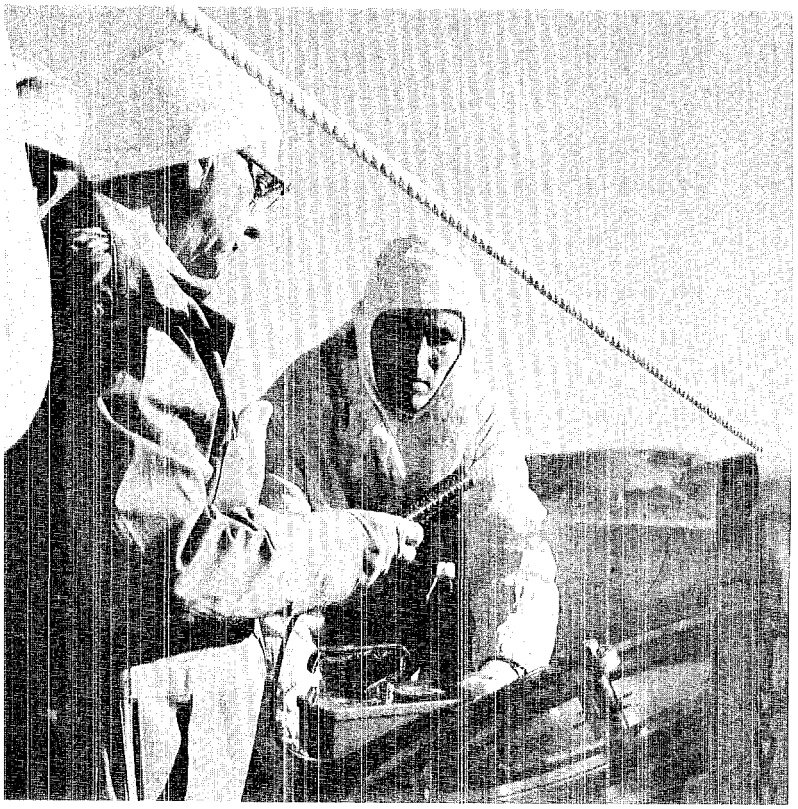
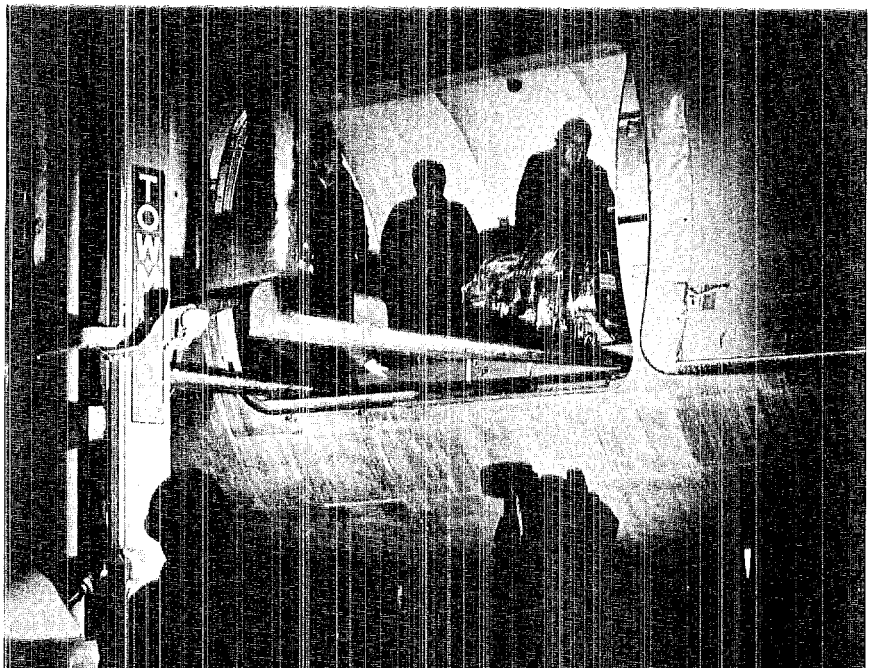


Checking the radioactivity of the neutron wheel after recovery from its target sled are George Cowan, J-11 group leader and Ron Cosimi, J-7.

Ben Diven, P-3 group leader, right, talks with Carl McCormick, EG&G control room supervisor.

The Pa^{233} sample was offloaded at the Desert Rock airstrip after being flown to NTS from the National Reactor Testing Station in Idaho.



Pommard

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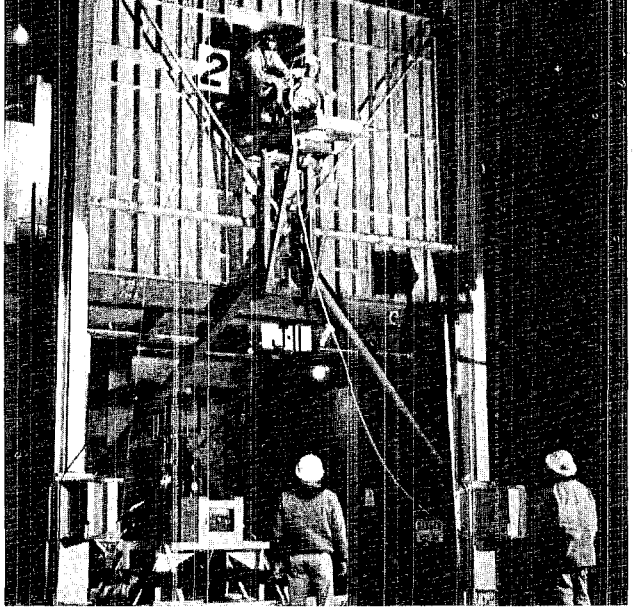
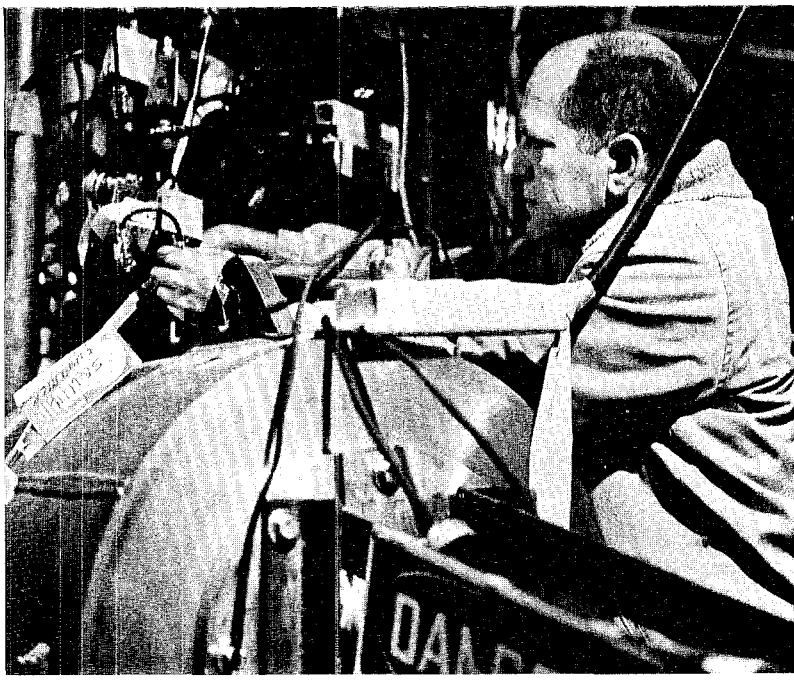
positioned on the second floor for experiments conducted by P and W divisions--led by Ben Diven, P-3 group leader, and Art Hemmendinger, W-8 group leader. One of these experiments consisted of 30,000 curies of protactinium 233. The radioactive Pa^{233} was made in a reactor at the National Reactor Testing Station in Idaho, and flown to NTS where it arrived barely five hours before shot time and was inserted into its proper position in the target sled.

Another experiment involving a radioactive sample was conducted on the third floor where J-16, under Group Leader Neel Glass, had about 2,000 curies of europium 152. This sample was irradiated at the Savannah River Laboratory and



Only hours before shot time, the Pa^{233} sample was hoisted to the second floor for insertion into the target sled.



Testing cable connections on one of the J-16 experiments is Group Leader Neel Glass.

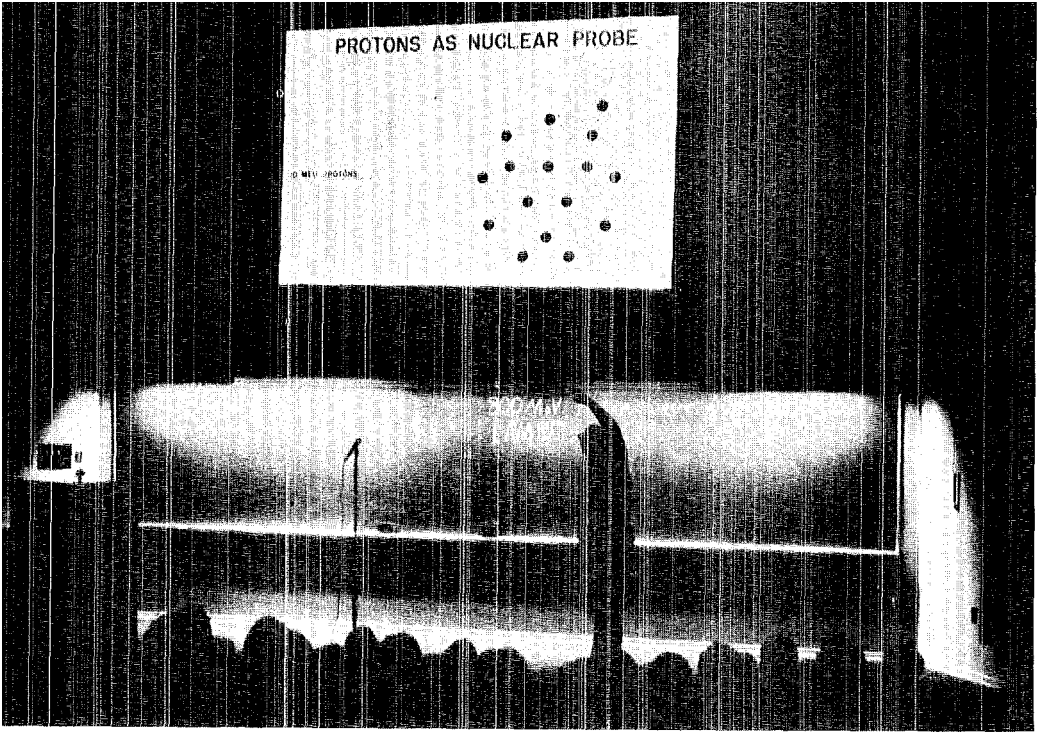
Don Phillips and Glen Barber, both J-12, adjust a detector prior to placing it in position, above the "catcher" floor.

then assembled, purified and put into target form at Oak Ridge before being placed in the tower.

The "beam catcher"—a large tank of water—was located on the fourth floor to absorb most of the scattered radiations from the experiments on the lower floors.

Neutron detectors designed and built by J-12, under the direction of Lee Aamodt, group leader, were positioned above the "catcher" floor. These detectors are much more efficient than the detectors previously used and are able to furnish more precise data on the energies of scattered neutrons from samples of rare elements placed on the fifth floor.

It will be about a year before most of the data from the Pommard event can be analyzed and complete results known. But early indications are that much data was acquired that will contribute greatly to scientific knowledge of nuclear interactions.



Bill Hassenzahl, MP-4, is silhouetted against the blackboard as he illustrates a point about the Los Alamos Meson Physics Facility (LAMPF).

Science Youth Days

A Career Stimulus

Queue of buses unloaded students in front of the Administration building where the day's activities began with a welcome by Laboratory officials.

Twelfth annual Science Youth Days at Los Alamos Scientific Laboratory were a drawing card for nearly 700 high school students from 34 schools in a five-state area.

Synonymously known as Edison Days, the annual gathering is an educational program to acquaint students with the actual work of scientists and engineers, with an ultimate aim to stimulate young men and women to pursue a career in science, engineering or technology.

The program was originally designed to correlate with the birthday of Thomas A. Edison, inventor of the electric lamp and 1,096 other creative patents. But at Los Alamos, past experience with inclement weather made the February 11 birthday undesirable. Schools planning to participate were sometimes unable to make the trip because of

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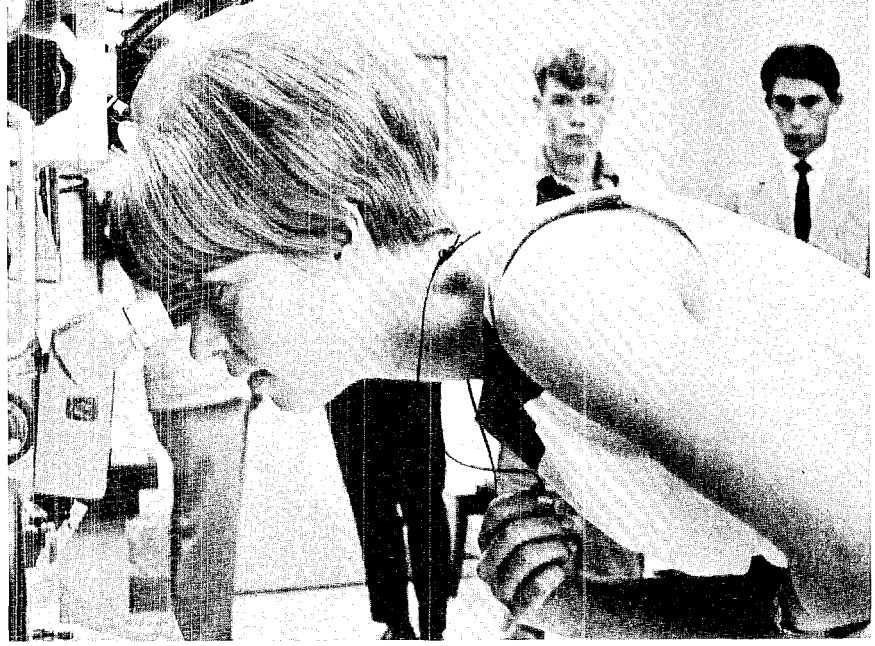
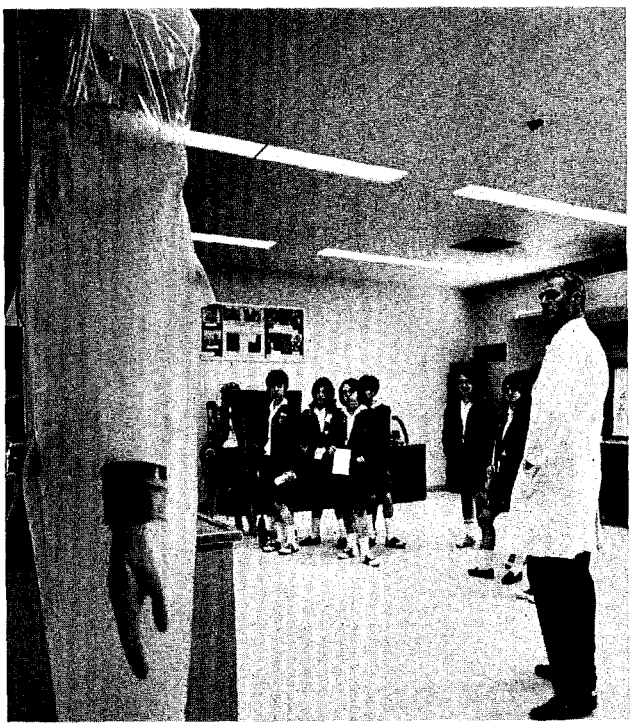
Geraldine Nez, Sierra Grande High School, examines an aluminum cylinder crimped at both ends by a fast rising magnetic field. This demonstration in the Project Sherwood area was designed to show how plasmas can be contained by a "magnetic bottle."



Luci Lundgren, Los Alamos High School, peered through the microscope on a LASL-developed automatic electronic cell counter to see individual cells illuminated by strobe light.

John Palsedge, P-18, used a wrench to demonstrate the powerful magnetic field surrounding a DC plasma chamber (cesium device) at Project Sherwood. Students shown in this photo are from Phoenix, Ariz.

How liquids are measured for level of contaminaton is explained to students from Sierra Grande High School by George Johnson, H-7 at TA-50 (liquid waste disposal site).



Jim DeField, H-8, describes a protection suit, worn in areas where toxic materials would otherwise be harmful to skin and inhalation. Students are from Loretto Academy, Santa Fe.

Students from Farwell, Texas heard Jere Knight, J-11, outline physics experiments conducted on the Tandem Van de Graaff accelerator.

A Career...

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snow conditions, and their absence was the reason for many last minute changes in the scheduled tours. Last year the event was changed to April.

The total number of students participating in the two-day event was divided in about half. One half was given a tour of Laboratory facilities April 4 and the other half April 5. The same program, planned and administered by Pub-2 and assisted by Pub-1, was followed on each of the two days.

A similar program, involving the participation of LASL personnel at Atomic Energy Commission and contractor laboratories at the Nuclear Rocket Development Station near Las Vegas was held in February.

Students attending the Los Alamos program were split into three groups each day, following a brief welcome by Laboratory officials. In rotation, each of the groups visited the Physics building and Van de Graaff areas, Sherwood laboratory, and Health division facilities. Scientists in these areas showed the students various research instruments and explained research programs and problems.

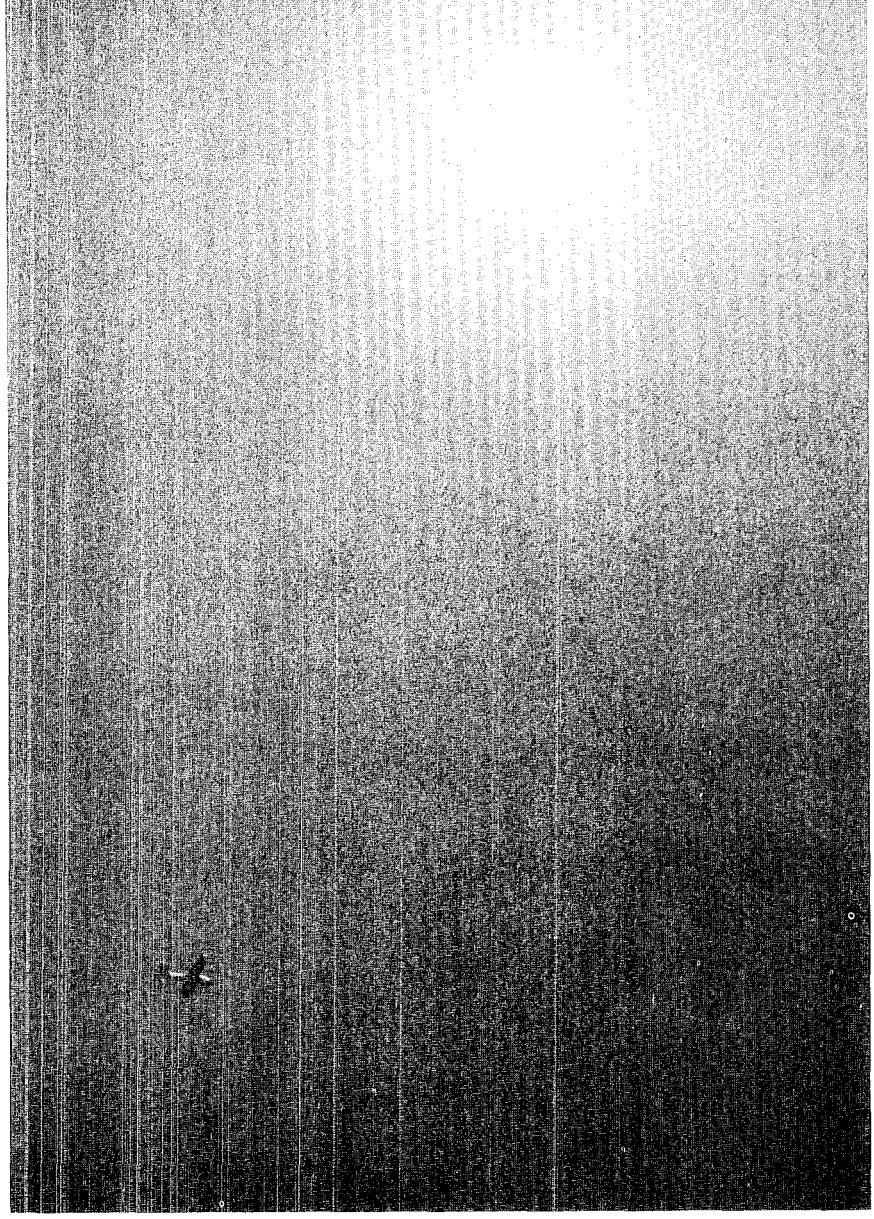
From Los Angeles High School came five students, selected for the tour through competition.

New Mexico students came from Espanola, Gallup, Jemez Valley, Loretto Academy, Los Alamos, McCurdy, Pojoaque, Robertson, St. Catherine Indian School, St. Michael's, Santa Fe, Taos and Mountainair.

Colorado schools represented were Alamosa, Antonito, Centauri, Del Norte, Mile High Academy, Pagosa Springs, St. Mary's, Salida, Sargent, Sierra Grande, and Platte Canyon.

From Texas were Dalhart, Snyder and Farwell. Six high schools from Phoenix, Ariz. represented were Phoenix Union, Alhambra, Camelback, Central, Maryvale, and South Mountain.

Air Sport That Predates The Airplane



A sailplane is silhouetted beneath the sun. The craft's ability to fly is dependent on the sun for the air conditions it creates.

By Ken Johnson

Although the glider predates the powered airplane by nearly half a century, it is something new to a handful of men and women from Los Alamos and Santa Fe.

They are members of the Sangre de Cristo Soaring Club, Inc., one of the newest organizations on "The Hill." The club is made up of nine persons from Los Alamos and four from Santa Fe.

It was conceived in the early months of 1967 and born in May. President Donald Ott, H-4 recalls, "I used to fly power-driven airplanes, but had followed soaring for several years. I was interested in the sport, but couldn't find anyone else."

A little more than a year ago, Ott received a very rewarding phone call. The caller was Dr. Thomas Brandes, a newcomer to Santa Fe from California, who found Ott's name in a soaring directory. Brandes was a pilot of some experience in both power-driven airplanes and gliders, not only in civilian life, but in military background as well.

Brandes expressed some disappointment in finding that there was no organized soaring club in the area, and that the closest thing to it was an interest in one, maintained by Ott.

But a common interest and enthusiasm for the sport had been generated, and preparations for a soaring club got under way with Ott and Brandes at the helm. They talked it up in their own circles and even advertised in area news-

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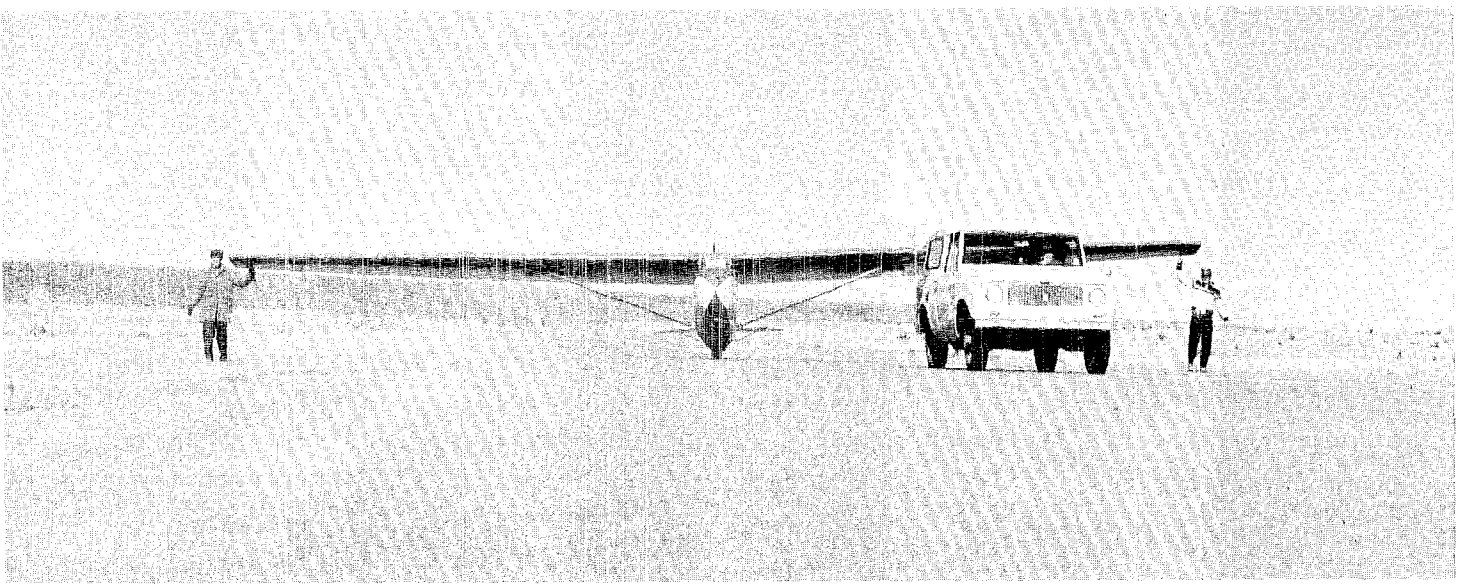
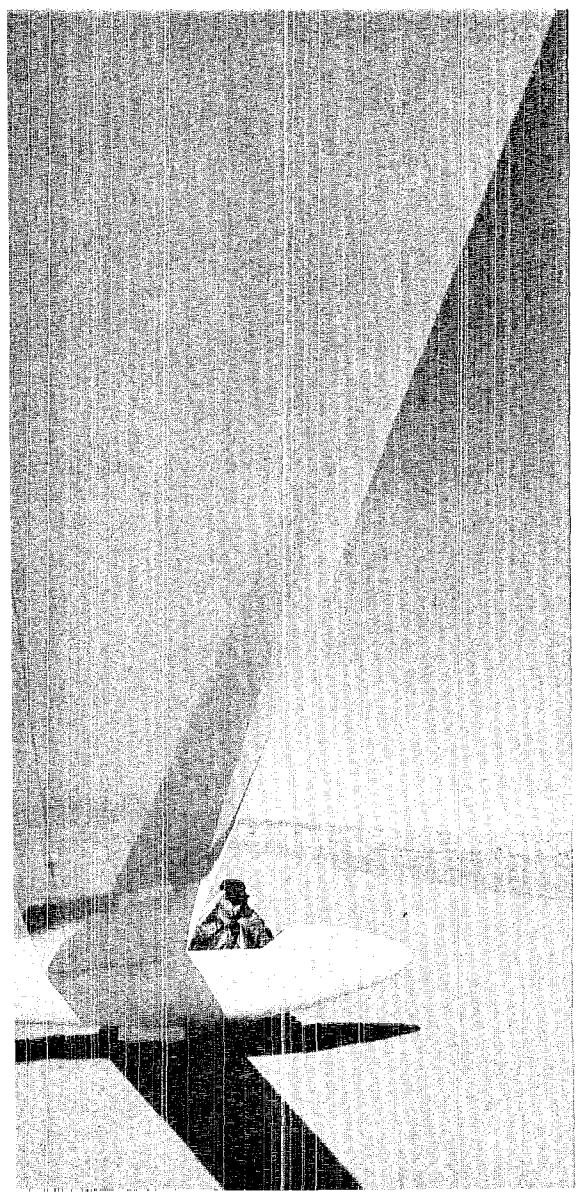


One of Tom Beaman's gliders is towed onto the runway by vehicle. Beaman is the wing runner at right. At left is Harold Davis. Don Ott is driving the vehicle.



Dr. Thomas Brandes inspects his sailplane at the Espanola Airport.

Air Sport . . .

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papers to find other interested persons.

Meanwhile, Ott was learning to be a glider pilot. He joined a club in Albuquerque, using its sailplane and instructors to learn how to fly. Brandes was also, and still is, a member of the Albuquerque club.

Planning for a local club continued. Individual contacts with interested persons became more frequent, and finally an organizational meeting was held. About 40 persons had shown interest in the organization, and from that number, nine, including Ott and Brandes, became charter members of the Sangre de Cristo Soaring Club, Inc.

Brandes had his own plane. Six others—Ott, Kenneth Cooper, N-3; Samuel T. Donaldson, J-15; James H. Fretwell, CMF-9; and William C. Overton, Jr., CMF-9; all of Los Alamos, and Thomas C. Beaman, Santa Fe—invested $600 each and bought a sailplane from a club in Boulder, Colo. The other two original club members were Mrs. Michelle Brandes, a licensed glider pilot, and William Chaney W-7.

Although the club was organized, members were not glider pilots, with the exception of Tom and Michelle Brandes, and no one, locally, offered pilot instruction. Determined to learn, club members went elsewhere. Fretwell, like Ott, took his instruction from the Albuquerque club. Donaldson and Jere L. Green, CMB-11, who joined soon after the club's formation, went to Guthrie, Okla., and Cooper, Beaman and Chaney went to Abilene, Texas.

Since then, Beaman has purchased a tow plane and two sailplanes of his own. He has incorporated under the name Rocky Mountain Wave Flights, Inc. He rents and sells gliders, and gives glider pilot instruction. The corporation is presently headquartered at the Espanola Airport, which is also used as base headquarters for the club's soaring operations.

Since acquiring two aircraft of his own, Beaman has sold his in-

terest in the club plane to Green, and Robert E. MacFarlane, P-2, has become the seventh to invest in the craft.

Ott recently purchased his own plane, and Chaney is building one of his own design. The completion of Chaney's craft will give the group a combined total of six sailplanes.

Not all members of the club have their own aircraft, and although a sailplane is available, not all of them fly. Ott pointed out that membership is not limited to those who want to fly. Persons who are interested can join and contribute to the sport in other ways. A good example is Harold Davis, CMB-6, who flys tow planes for the gliders.

"It takes more than the pilot to fly a glider," Ott noted. "In addition to the pilot and tow plane pilot, or car driver, we are also dependent on someone to help unload the glider from the trailer and assemble it, someone to hook up the 200-foot tow line and act as wing runner (person who supports the wing until the plane is put in motion and is able to support itself). Unless the sailplane lands at the takeoff point, we are also dependent on other persons to pick up the pilot and retrieve the aircraft after landing," Ott said.

If a glider pilot had to hire someone for each of the ground operation jobs, it would be very expensive, and the help he would receive would most likely be inexperienced. Through club membership this cost is eliminated, because one member can rely on help from another. The tow plane can be flown by any one of three members when needed. They are Brandes, Beaman, and Davis.

The glider was first a research tool in conquering the problems of manned flight. A Frenchman, Captain Le Bris, actually got off the ground in a horse-towed glider, as early as 1855. Gliders were, of necessity, the first airplanes, because there was no suitable powerplant available at the time. Even so, manned flight was in such early stages that

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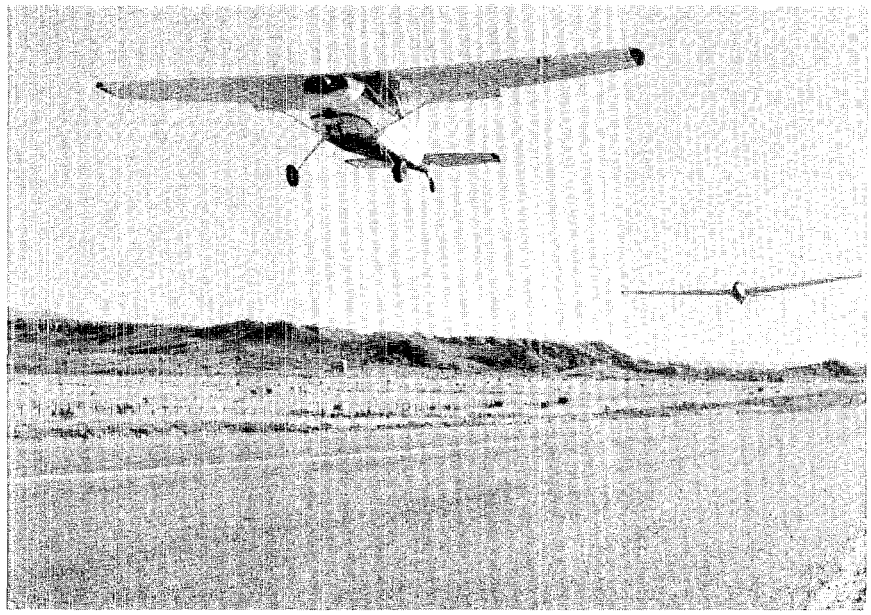
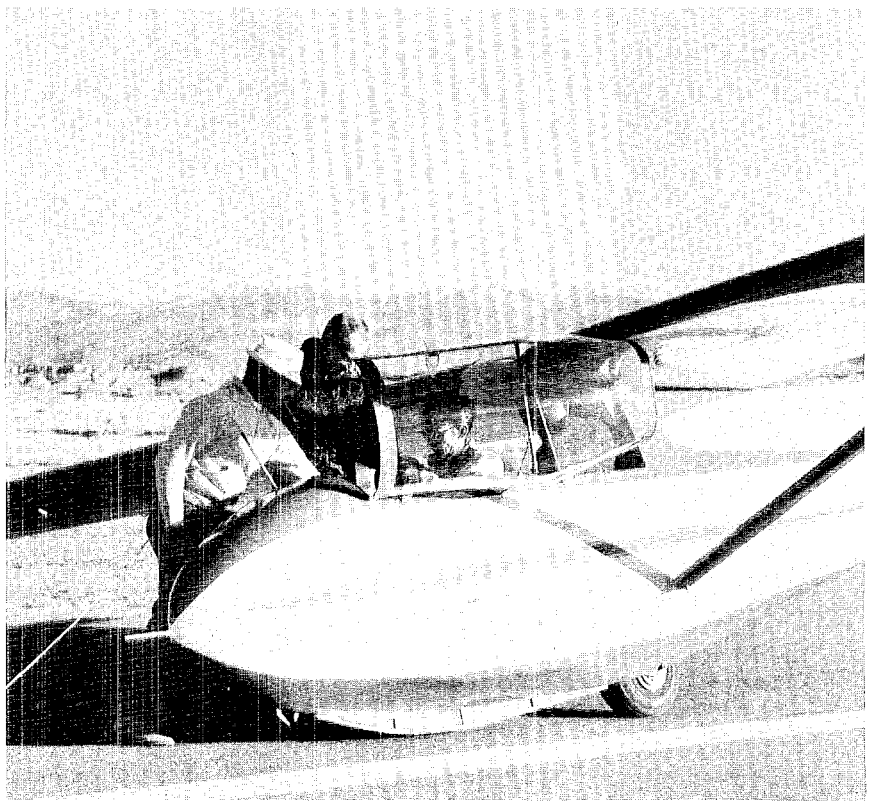


Piloting the club's sailplane in this takeoff scene is Don Ott. Harold Davis flies the tow plane.

Tom Beaman's twin seater is readied for takeoff. Beaman is in the back seat of the craft and Jere Green in front. At left, holding tow line is Don Ott. To his right is Sam Donaldson. The tow line hitch is shown in front of the landing skid on the bottom of the sailplane.



Air Sport . . .

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the glider offered sufficient challenge, without adding the problems of how to power it.

The two major problems with gliders—stability and control—were solved by the Wright Brothers. With these under control, the Wright Brothers needed only an engine to develop their 1902 model glider into an airplane.

When the airplane appeared, the glider, as a research tool, vanished and became for the most part, a recreational item, which it still is. For a short period of time during World War II, the glider did enjoy new life as a troop and cargo carrier.

Since then, soaring has become an increasingly popular sport in the United States and certainly at Los Alamos. Ott noted that the number of soarers has increased from approximately 6,000 to 8,000, nationwide, in the past year.

Most recent member of the Sangre de Cristo Club is Mrs. Louise McKinney, Santa Fe. Two members of the club are also grooming their sons for future membership. They are Kevin Ott and Barry Cooper, both 14.

The popularity of man against the elements does not exist only among the supermen circles, nor the recognized "athletic" type of person. Physical power is not a requirement, a fact reflected by the number of women and teenagers that participate.

The glider pilot flies his machine every second and thinks far ahead of it. He is dependent on the sun for his power, and the air conditions it creates. But this alone does not enable him to soar, for he must seek and "hook" the thermals which give his machine the lift needed to remain airborne.

"A person can get hooked on soaring just like others get hooked on golf or fishing. I used to play golf, but have practically given it up for sailplanes. This is really the greatest," Ott concluded.

Sailplane over the Rio Grande, north of Espanola, is piloted by Kenneth Cooper. Photo was taken from the tow plane by Bill Jack Rodgers, Pub-1.

New Division Formed at LASL

Roger Lazarus has been named to head the new computer science and services division at Los Alamos Scientific Laboratory.

A new technical division, concerned with computer problems and activities, has been formed at LASL. Three theoretical physics groups—T-1, T-7 and T-13—were transferred to the new *computer science and services division* to form the nucleus of "C division."

Roger Lazarus was named division leader with Tom Jordan as his alternate. Paul Harper and Bill Spack are assistant division leaders while Nick Metropolis transferred to C-DO in an advisory capacity. Also, the office of coordinator for automatic data processing with Ed Voorhees and Jack Worlton has been transferred to the new division.

About 150 LASL employes were involved in the transfer.

The purpose of establishing C division is to increase the long-term efficiency and capability of LASL's computing facilities in support of all Laboratory programs. The creation of the new division will consolidate the Laboratory's major computing activities.

Also, Lazarus said, "One of the benefits in forming C division will come from bringing the views of LASL's own computer engineers to bear on the problems in the Laboratory's overall computer needs."

A few of the personnel in T-1, including Group Leader Bengt Carlson, did not transfer.

Carlson, credited by Lazarus and others with being the man most responsible for building LASL's computing facilities from a meager beginning to what they are today, elected not to move over to the new division. Instead, Carlson will return to his major interest—research—and will head a new scientific group in T division concerned with the theory of neutron and radiation transport.

Lazarus also noted that Carlson has long urged the formation of a new division such as computer science and services and properly deserves the credit for originating many of the proposed changes.

"A main change in policy," Lazarus said, "will be that the service role of C division for other divisions, departments and groups will be emphasized. More programming will be done in C division for other computer users than has been possible in the past." This will alleviate, to some extent, the necessity of individual divisions or departments hiring their own programmers.

Although LASL is ranked high on the list of the world's major computing facilities, Jordan says there are computing needs known to exist in the Laboratory that are far beyond the present capabilities.

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Eight Men Appointed to New Posts in MP

Eight men have been appointed to new positions in the Los Alamos Scientific Laboratory's MP Division. Announcement was made by Louis Rosen, division leader.

Raymond A. Gore has been appointed associate group leader of MP-1, with responsibility for coordinating work assigned to the analog systems section. The group is responsible for module local controls, module data acquisition systems, special instrumentation, and the overall module control system design for the Los Alamos Meson Physics Facility (LAMPF) mockup program.

Also in MP-1, Dale T. Van Buren has been named assistant group leader with responsibility for development and maintenance of the digital systems aspects of the computer control hardware for LAMPF.

In MP-2, Robert A. Jameson has been appointed associate group leader.

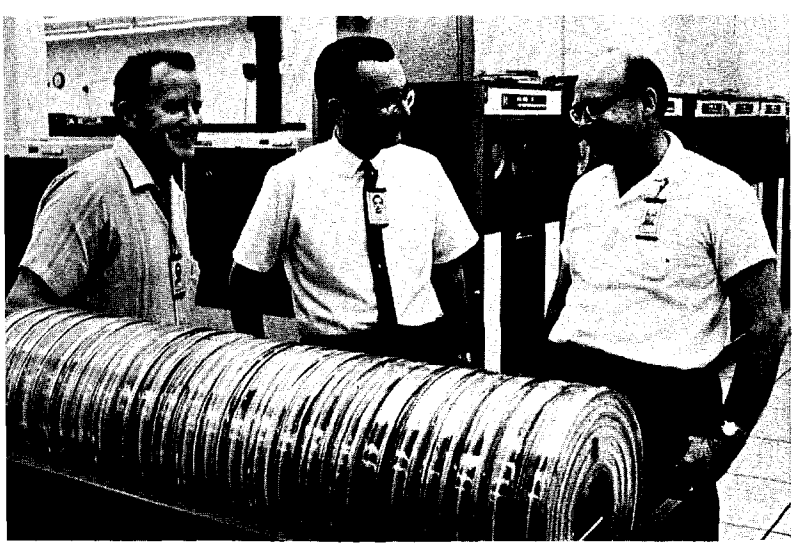
New section leader in MP-3, in charge of mechanical design of the drift tube linear accelerator, is Edgar D. Bush; Valgene E. Hart, section leader in charge of the installation and alignment of the accelerator sections; Steven P. Koczan, section leader in charge of side-coupled cavity fabrication; and James R. Ruhe, section leader in charge of mechanical systems design, including vacuum systems and cooling systems.

Promoted to section leader in MP-4 is Henry A. Thiessen. His responsibilities include the design and development of pion beams, pion spectrometers, and equipment for the detection and analysis of scattered pions, in connection with the LAMPF experimental program.

New Division . . .

continued from preceding page

Currently, the general purpose computers in the Central Computing Facility (CCF) include three Control Data 6600's; two IBM 7094's; one IBM 7030 (STRETCH); and several small computers. MANIAC II, not now located in the CCF, is expected to be moved there in about a year.



Discussing the formation of the new C division are the three men who will assist the division leader in policy and administration. They are Paul Harper and William Spack, assistant division leaders, and Tom Jordan, alternate division leader.

"We intend to obtain a storage device capable of holding a trillion bits of data that will be accessible to all computers in the division and to certain computers at other sites as well," Jordan said. This is tentatively planned for fiscal year 1970.

In addition, the computers not physically located in the CCF will be linked in the future to the CCF facilities. This will permit all of LASL's computing equipment to contribute and obtain additional data—thus increasing the capability of the computing facilities as a whole.

"The new division has been given the responsibility of having an overview of all the computer services needed by the Laboratory," Lazarus noted.

Following is the C division group structure as established by Lazarus and Jordan:

C-1: CCF operations support—Don Smith, group leader, William Hudgins, alternate.

C-2: CCF systems support—Charles Folkner, group leader.

C-3: CCF plant and hardware support—Chester Kazek, Jr., group leader.

C-4: scientific applications services—Roger Lazarus, acting group leader.

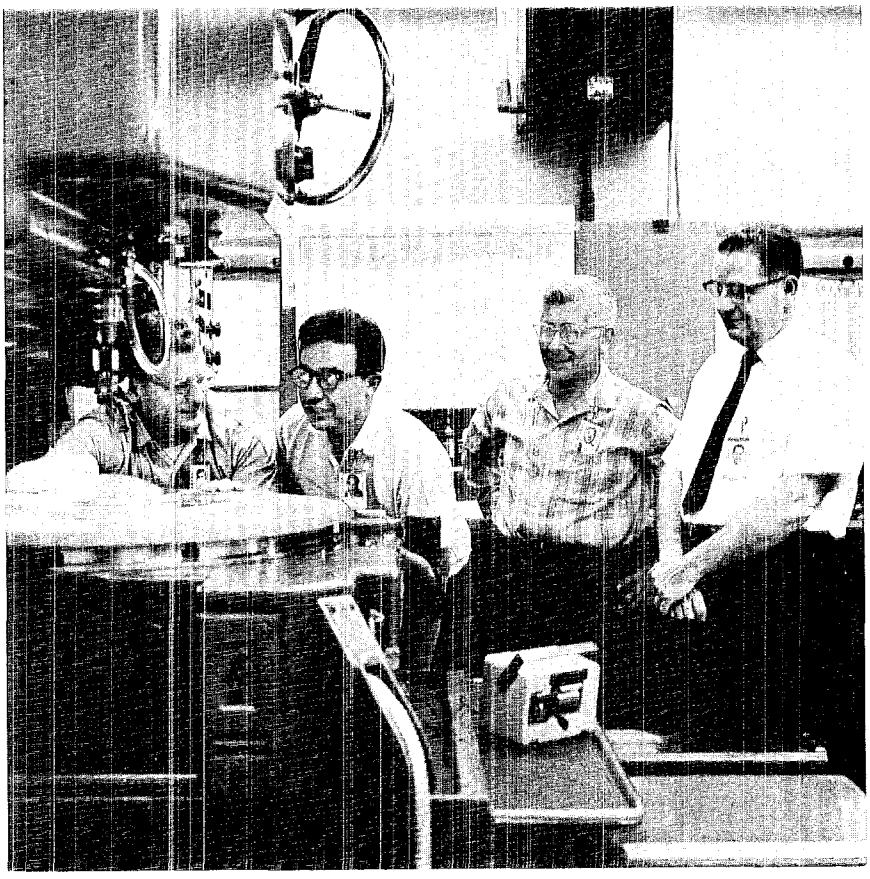
C-5: statistical services and management applications—Keith Zeigler, group leader, Roger Moore, alternate.

C-6: numerical methods and consultation—Tom Jordan, acting group leader.

C-7: computer science research—Mark Wells, group leader, Bill Spack, alternate group leader.

Lunch Hour Class Becomes Four-Year Program

By Bob Brashear



Machinist Trainee John Archuleta, second from left, gets some help from Bob Gill, shop foreman. At right are Marin Mier, training supervisor and F. E. Stack, department head.

Interest in a lunch hour shop mathematics class has culminated in a formal apprentice training program, organized and operated by the shops department of Los Alamos Scientific Laboratory.

Gordon Anderson, a machinist, proposed the lunch hour math class, seven years ago. "The response was amazing and instructive," F. E. Stack head of Shops said. "So many machinists signed up for the class we felt it was time to start a broader training program."

Now, a young man can enroll in the sequential four-year program, and receive training available in only a few shops elsewhere in the country, Stack said. Seven years ago, men were hired just to work wherever they were needed, and gained their knowledge through on-the-job training. Within two years it was decided that a more formal program should be undertaken. A six-year progressive job-training schedule was worked out to coincide with Laboratory hiring policy that a machinist should have at least six years practical experience.

By February, 1967, plans for the sequential four-year program were completed. The program included

continued on next page

Use of gauges in a machine shop is explained to a class of trainees by Al Delgado, SD-1. In back of class is Marin Mier, training supervisor.

Lunch Hour Class . . .

continued from preceding page

160 hours of class instruction in addition to a full work schedule—much of it under direct supervision. Marin Mier, a former LASL machinist who had been teaching shopwork in a Santa Fe high school, was hired as program supervisor.

The first group of trainees was started in March 1967, and a second group was started this past March, Stack said. With those ending up their six-year program, and those in the streamlined four-year program, Mier has 29 men in various training stages. Stack said the present plan is to select five men a year from applicants. In this way men in need of such training will be able to obtain it, and, a reservoir of skilled machinists will be built up to replace those retiring from Laboratory service each year. It is hoped that the number of new trainees can be increased to 10 each year, Stack said.

To obtain recruits for the sequential training program Stack and Mier work closely with Robert J. Hayden, equal employment opportunity officer for the Laboratory. As a three-man committee they screen applicants from the Los Alamos-Espanola-Santa Fe area, first individually and then together to make their final selections.

To qualify, the applicant must have a high school diploma, and be between 18 and 30 years of age.

The first year, he will receive 160 hours of class work in shop operations, safety, shop mathematics, blueprint reading, and book work on heat treating processes, cutting tools, and related subjects. Resource people—specialists in their fields—are brought in to lecture, and much individualized training is received through foremen of various shops. The remaining three years are spent at different shops divisions throughout the Laboratory for more detailed work experience.

The trainee is paid for his work throughout the course. When he graduates he is qualified for the job title "Laboratory Machinist." Advancement through service and experience will carry him to the top title of "Developmental Machinist."

Books for the classroom course are those approved by the National Tool, Die and Precision Machining Association of Washington, D.C.

Training at LASL shops is broader in scope than in many commercial machine shops because of the unusual materials and machining processes required to furnish equipment for research programs, Stack said. In addition to the standard equipment found in machine shops, the trainee will also learn about numerical control machines run by coded paper tape; electric discharge machines which work metal through erosion by electrical impulses; spherical machining processes, and machines working with tolerances down to five-millionths of an inch. He will also learn to handle the so-called "exotic" materials like beryllium, plutonium, uranium, tantalum, titanium and niobium.

"Although our apprentice training program parallels many standard programs, it necessarily must be more exacting and broader in scope," Stack said. "The man who completes the course can take his place in any of the modern shops in the country or remain here as a valuable shops employe."

short subjects

Dr. Donald Cooksey, former associate director of Lawrence Radiation Laboratory, Berkeley, Calif. will receive the Atomic Energy Commission Citation, it was announced by Glenn T. Seaborg, chairman of the AEC.

The citation, accompanied by a medallion, will be presented by AEC Commissioner James T. Ramey May 20 at the University of California, in Berkeley.

Cooksey was a central figure in the development of the 37-inch cyclotron at Berkeley, and instrumental in establishing entirely new levels of performance for such machines.

He later became chief deputy to Dr. Ernest O. Lawrence, the Laboratory's founder, in directing the many aspects of the development of the electromagnetic process for the production of uranium 235 for atomic weapons.

He was a key member of the Lawrence Radiation Laboratory staff for 23 years, 16 as associate director, before his retirement in 1959.

Patents on a High Temperature Rock Drill and Liquid Excursion Pulsed Reactor, both invented by LASL employes, have been made available for public use by the Atomic Energy Commission.

Inventors of the drill are **D. E. Armstrong, J. S. Coleman, B. E. McInteer, R. M. Potter,** and **E. S. Robinson,** all of CMF-4.

Inventor of the reactor is **L. D. P. King,** Rover Flight Safety officer.

E. F. Hammel, CMF-9 group leader, has been appointed to a one-year term as chairman of the Advisory Panel to the Heat Division of the National Bureau of Standards. He will also be a member of the Advisory Panel to the Institute for Basic Standards, the parent unit.

The Heat Division Panel is one of 20 technical advisory groups whose members are appointed by the National Academy of Science-National Research Council to provide technical advice to the Bureau.

Two new isotopes have been discovered by Los Alamos Scientific Laboratory J-11 radiochemists.

The isotopes were discovered through experiments using plutonium 244, the most stable of the plutonium isotopes and therefore ideal for use as a target material in the production of new isotopes.

They were chemically separated from the products resulting from alpha particle bombardment of the plutonium 244.

The new isotopes have been labeled Am^{247} and Am^{246} and are short-lived. The Am^{247} has a half-life of 24 minutes, while Am^{246} has a half life of 40 minutes.

Group J-11 received 1.5 milligrams of plutonium 244 last April, and experimentation began shortly thereafter.

The 1.5 miligrams of Pu^{244} represented one-fifth of the world's known supply at that time.

T. E. Ehrenkranz, safety engineer for H-3, holds a Certificate of Appreciation, presented to him, on behalf of the Atomic Energy Commission, by Herman E. Roser, local AEC area manager. Ehrenkranz received the award in appreciation of his contribution, as a member of a committee, in writing "Electrical Safety Guides for Research," which relates electrical hazards and safeguards associated with the use of unusual high energy electrical apparatus in research. At center is Roy Reider, H-3 group leader, and at right, Dr. Thomas Shipman, H-Division leader.

The Technical Side

4th Mossbauer Symposium, Chicago, Ill., Jan. 28:

"Temperature Control" by W. A. Steyert and M. D. Daybell, both CMF-9

Annual Conference of New Mexico Industrial Photographers Association, Albuquerque, March 3:

"Introduction to Laser Photography" by R. A. Jeffries, GMX-7 (Invited talk)

Presentation at Meeting of the New Mexico Society of Hospital Pharmacists, Albuquerque, March 6:

"Radiation Effects in Mammalian Cells" by D. F. Peterson, H-4 (Invited talk)

Presentation at New Mexico Chapter of National Classification Management Society Meeting, Albuquerque, March 7:

"Professionalism in Classification Management" by L. M. Redman, D-6

Branch Meeting of the Institute of Electrical and Electronic Engineers, University of Alabama, University, Ala., March 7:

"Los Alamos Meson Physics Facility" by D. A. Swenson, MP-3

Surface Seminar, Sandia Base, Albuquerque, Feb. 15:

"Vaporization of Arsenic, Results, Problems and Prospects" by C. C. Herrick, CMF-13

Meeting of the New Mexico Chapter of the American Society of Safety Engineers, Albuquerque, March 15:

"Some Aspects of Nuclear Criticality Safety" by D. R. Smith, N-2

American Physical Society Meeting, University of California, Berkeley, Calif., March 18-21:

"Interaction of Surface and Bulk Depletion Layers in Silicon" by C. L. Wilson, T-7 and S. J. Brient, University of Texas, El Paso, Texas

"Space Charge Effects in Degenerate Silicon" by S. J. Brient, University of Texas, El Paso, Texas and C. L. Wilson, T-7

"Magnetic Properties of $PrAl_2$ and $ErAl_2$" by C. E. Olsen, CMF-13, N. G. Nereson and G. P. Arnold, both P-2

"Neutron Energy Distribution in the Dense Plasma Focus" by P. J. Bottoms, J. W. Mather and A. H. Williams, all P-7

"Virial Expansion for Hard Squares" by A. M. Lockett III, T-9

"Direct Correlation Functions in the Theory of Classical Fluids" by M.S. Wertheim, T-DOT

Institute of Electrical and Electronic Engineers Spring Meeting: New York City, N.Y., Mar. 18-21:

"The Impact of Computers on the Control of Particle Accelerators" by H. S. Butler, MP-1

8th Meeting of the Filament Winding Working Group, Bendix Corporation, Kansas City, Mo., March 20-21:

"Epoxy Resin Systems for Filament Winding on Explosives" by W. A. May, Jr., GMX-3

Presentation at the Nuclear Engineering Department, University of Texas, Austin, Texas, March 21:

"Fast-Critical Assemblies—Story Without End" by J. A. Grundl, N-2

Symposium on Microwave Power, Session on Advanced Microwave Systems, Boston, Mass., March 21-23:

"The Los Alamos Meson Physics Facility Accelerator" by D. C. Hagerman and R. A. Jameson, both MP-2

Presentation at Arizona State University, Tempe, Ariz., March 22:

"A Vaporization Problem" by C. C. Herrick, CMF-13

Department of Physics and Astronomy Colloquium, University of New Mexico, Albuquerque, March 22:

"Basic Research and Practical Applications of the Los Alamos Meson Facility" by L. Rosen, MP-DO

Seminar, National Accelerator Laboratory, Oakbrook, Ill., March 26:

"Design and Performance of the Los Alamos Electron Prototype Linac" by E. A. Knapp, MP-3 (Invited talk)

Institute of Scientific Research Colloquium, New Mexico Highlands University, Las Vegas, N.M., March 28:

"Inorganic Combustion Calorimetry—Some Recent Work Done at LASL" by C. E. Holley, Jr., CMF-2

Presentation at New Mexico Highlands University, Las Vegas, N.M. (Sigma Xi Lecture), March 28:

"Twenty Months with the International Atomic Energy Agency, Vienna" by C. E. Holley, Jr., CMF-2

Symposium on Numerical Methods for Turbulent Flows and Separated Flows, Purdue University, Lafayette, Indiana, March 28-29:

"Transport Equations for Turbulence" by P. I. Nakayama, T-3

Annual Spring Meeting of the Rio Grande Chapter of the Health Physics Society, Albuquerque, March 29:

"Some Health Physics Aspects of Nuclear Weapons Incidents" by W. H. Langham, H-4 (Invited talk)

American Nuclear Society Meeting, Santa Fe, March 29:

"PHERMEX" by D. Venable, GMX-11

155th National Meeting of the American Chemical Society, San Francisco, Calif., March 31-April 5:

"The Chloride Catalysis of the Np(III)-Fe(III) Reactions in Aqueous Acid Solutions" by T. W. Newton, G. E. McCrary, and W. G. Clark, all CMF-2

"Proton and Deuteron Nuclear Magnetic Resonances in Ice Polymorphs" by S. W. Rabideau and E. D. Finch, both CMF-2

"Structure and Bonding of Li_4RhH_4" by L. B. Lundberg, D. T. Cromer, both CMF-5 and C. B.

Magee, University of Denver, Denver, Colo.

"F^{19} NMR Studies of Transition Metal Fluoride Complexes" by N. A. Matwiyoff, Pennsylvania State University, University Park, Penn., L. B. Asprey, E. Fukushima, M. J. Reisfeld, and W. E. Wageman, all CMF-4

"Coordination Behavior in Actinide Complexes" by T. K. Keenan, L. B. Asprey, and R. A. Penneman, all CMF-4

"Electronic Energy Levels of $5f^2$ Neptunium (v)" by L. P. Varaga, Oklahoma State University, Stillwater, Okla., L. B. Asprey, R. A. Penneman, and T. K. Keenan, CMF-4

"Activation Energies for Some Gas Phase Reactions of the Hydroxyl Radical" by N. R. Greiner, GMX-2

"Collision Broadening of the Ultraviolet Absorption Lines of OH and Other Transient Species by a Flash Photolysis Method" by R. Engleman, Jr., GMX-2

"Mass Yields from Thermal-Neutron-Induced Fission of ^{242m}Am" by K. Wolfsberg and G. P. Ford, both J-11

"Preparation of U-3 w/o Mo Alloy Powders by Ca Reduction of Mixed Oxides" by M. C. Tinkle, CMB-8

Seminar at Bell Telephone Laboratories, Murrayhill, N.J., April 1:

"Lattice Dynamics of Gallium Phosphide" by J. L. Warren, P-2

Presentations at Health Physics Society: North Carolina Chapter, Chapel Hill, N.C., April 1; Connecticut Chapter, New Haven, Conn., April 3; and Baltimore-Washington Chapter, Bethesda, Md., April 4:

"Some Health Physics Aspects of Nuclear Weapons Incidents" by W. H. Langham, H-4 (Invited talk)

126th Meeting of the American Astronomical Society, University of Virginia, Charlottesville, Va., April 1-4:

"Satellite Observations of Galactic X-Ray Sources" by J. P. Conner and S. Singer, both P-4

American Institute of Aeronautics and Astronautics 9th Symposium on Engineering Aspects of Magnetohydrodynamics, Tullahoma, Tenn., April 3-5:

"Voltage Modes of a Lithium-Fueled MPD Arc Jet" by D. B. Fradkin, N-7, A. W. Blackstock, N-5 and D. J. Roehling, N-5

Spring Meeting of the Association of Secondary School Principals, Roswell, N.M. April 5:

"Performance Testing in Subhuman Primates" by J. F. Spalding, H-4 (Invited talk)

Nuclear Safety Committee Meeting, Dow Chemical Company, Rocky Flats Division, Golden, Colo., April 9:

"Problems of Maintaining Nuclear Safety Controls" by R. Reider, H-3

Meeting of the Federation of American Societies for Experimental Biology, Atlantic City, N. J., April 16-20:

"The Energy Metabolism of Mammalian Cells" by J. M. Machinist, W. D. Currie, and C. T. Gregg, all H-4

Fourth International Vacuum Congress, University of Manchester, Institute of Science and Technology, Manchester, England, April 17-19:

"Improved Tee Connections for Vacuum Systems" by H. M. Ruess, K-1 (presented by N. G. Wilson, K-1)

"A Dynamic Gas Flow Meter for Ultra High Vacuum" by N. G. Wilson, K-1

"A Mass Spectrometer for High-Temperature Inert Gas Analysis" by N. G. Wilson and C. R. Winkelman, both K-1

new hires

CMB Division

Linda J. Dimas, Santa Fe, CMB-11

D Division

Janet S. McKee, Los Alamos, D-8

Engineering Department

Hilton E. Jones, New Orleans, La., ENG-2

GMX Division

Edgar A. Sandlin, Riverton, N.J., GMX-1

Ernest E. Abeyta, Fairview, N.M., GMX-3

H Division

Minnie C. Sterkel, Los Alamos, H-DO

J Division

Dale R. Engstrom, Phoenix, Ariz., J-6

Evon L. Stephani, Idaho Falls, Idaho, J-8

Leo Romero, Santa Fe, J-14

Dometrios L. Basdekas, San Antonio, Texas, J-17

K Division

Lynn B. Lundberg, Denver, Colo., K-2

P Division

Kenneth D. Ware, Ann Arbor, Mich., P-7

James P. Carpenter, Columbus, Ohio, P-7

Personnel Department

Katherine I. Anderson, Los Alamos, PER-1

Public Relations Department

Barbara A. Bowen, Los Alamos, PUB-2

Shops Department

Joseph E. Hand, Phoenix, Ariz., SD-1

John D. Elliott, Lebanon, Ohio, SD-1

Supply and Property Department

Maria D. Rodriguez, Espanola, SP-DO

Thomas H. Harlow, Englewood, Colo., SP-3

T Division

William M. Ford, Santa Fe, T-1

Shiela M. Lotspeich, Los Alamos, T-1

Joe Z. Lovato, Jr. Albuquerque, T-1

Elizabeth K. Williams, Los Alamos, T-1

Jose L. Leyba, Espanola, T-1

Max Marquez, El Rito, N.M., T-1

Jerome H. Baslington, Stateline, Nev., T-1

Jerry F. Montoya, Espanola, T-1

Marjorie A. Schultz, Boulder, Colo., T-2

W Division

Henry F. Atwater, Gainesville, Fla., W-7

20 years ago in los alamos

Taken from the files of the May, 1948 Los Alamos Times by Robert Y. Porton

Los Alamos Housewife Eyes State Political Job

The spring bonnet of a Los Alamos housewife was quietly tossed into the arena this week when Mrs. John McClendon filed her candidacy for the office of State Representative for the county of Sandoval on the Republican ticket. Mrs. McClendon is the first resident of this community who will compete for state political office. She is a veteran of World War II, having served two years in the SPARS, womens' branch of the U.S. Coast Guard. As a member of the League of Women Voters, she helped register voters on the Hill for local and state election.

Plan To House 2,000 In New Community Area

Initial planning for a new construction workers' community of about 2,000 persons is underway, AEC Operations Division announced this week. The New Mexico Housing Corporation, which is under contract to the Atomic Energy Commission to develop the project, has submitted a tentative layout for the area. It will be located on the Bandelier Monument road opposite the mouth to Cedro Canyon. The 240 acres was acquired last fall from the Department of the Interior. The town will have a vital connection with the program for rebuilding of the Los Alamos laboratories, an Operations spokesman said. Included will be prefabricated houses, dormitories, barracks, a school, a market, shops, gas station, and fuel services. (EDITOR'S NOTE: And thus White Rock was first born.)

Housing Office Announces Rental and Utilities Rates for New Group

Rental and utility rates for the 92-unit group of apartments off Chapel Road were announced this week by the housing office. The units, all of which are the 2-bedroom type, are to be allocated on a non-priority basis. The rental rate on each unit is $46; for utilities, $10.50. Figures for the so-called "less pretentious" new Western Area houses are as follows: Single 2-bedroom, $54 rental, $14 utilities; 2-bedroom duplex, $50 rental, $13.50 utilities; 3-bedroom duplex, $56.50 rental, $14.50 utilities.

Ad For Hill Theater

Sunday, Monday, Tuesday—"Hollywood's Biggest Surprise!"

See a "REAL GOVERNOR" step out as a screen star. As a gangbuster he's terrific! As a singer, he's sensational! Governor Jimmie Davis in "Louisiana."

what's doing

OUTDOOR ASSOCIATION: No charge; open to the public. Contact leader for information about specific hikes.

Sunday, May 5, Pine Springs from Sportsmen's Club. Dibbon Hagar, leader, 2-6209.

Sunday, May 11, Camp May to Sawyer's Hill. Walter Green, leader, 672-3203.

PUBLIC SWIMMING: Los Alamos High School pool. Adults, 50 cents; students 25 cents. Pool closed Thursdays.

Monday, Tuesday, Wednesday, and Friday, 7:30 to 9:00 p.m.

Saturday and Sunday, 1 to 6 p.m.

Sunday, 7 to 9 p.m. Adults only.

LOS ALAMOS HIGH SCHOOL OLIONS: "David and Lisa" by James Reach, Friday and Saturday, May 10 and 11, 8:00 p.m., Civic Auditorium. Single admission tickets at $1.25 for adults and $ .75 for students available at the box office of the auditorium.

LOS ALAMOS LITTLE THEATER: "Sweet Charity" by Neil Simon, Friday and Saturday, May 24 and 25; and May 31 and June 1, 8:15 p.m., Civic Auditorium. Admission will be $2.50 and all seats will be reserved. Reservations may be made either by mail (P.O. Box 211) or at the Civic Auditorium box office.

LOS ALAMOS LITTLE THEATER: General Membership Meeting at Fuller Lodge on Tuesday, May 7 at 8:00 p.m. Election of officers for the 1968-69 season. All Little Theater members and interested persons are invited.

MESA PUBLIC LIBRARY EXHIBITS:

Art Exhibit:

May 1 through 31—Etchings by Henry Balink

Case Exhibits:

May 1 through 31—Oriental Cookery

SPORTSMEN'S CLUB: Beginning shotgun class starting Wednesday, May 1, 5:45 p.m. at the Sportsmen's Club, Rendija Canyon. Open to all interested persons, club membership not required. For further information call Reid Worlton, 672-9776.

Shotgun Shooting Schedule:

May 5—Practice skeet, 10 a.m.-2 p.m.

May 12—NSSA registered skeet shoot, starting at 9 a.m.

May 19—Practice trap shooting, 1 p.m.

May 26—Practice trap shooting, 1 p.m.

Michael Ravid, a consul-general of Israel, is given a tour of the Los Alamos Scientific Laboratory Science Museum by Bob Brashear, Pub-2. Ravid, who is headquartered in Los Angeles, Calif., was in Albuquerque to attend a meeting and was also honored at a luncheon in Santa Fe. He expressed an interest in the Los Alamos area.

BACK COVER:
Looking over Grand Canyon during a week's outing are members of Girl Scout Cadet Troop 44, Los Alamos. The photo was taken by Pub-1 Photographer Bill Jack Rodgers, who accompanied the 21 scouts and other adult sponsors. Ten of the scouts received their First Class badges in ceremonies held on the canyon floor.

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